

EXHIBIT B

SONY INTELLECTUAL PROPERTY LAW DEPARTMENT
3rd PARTY CTV WORKSHEET V.7
MAKE MODEL: VIZIO VX37L

United States Patent
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5,731,847
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Subtitle encoding/decoding method and apparatus

Abstract

Subtitle and video synchronization. Encoding and decoding of subtitle data is performed in real time. A buffer regulates a flow rate of the subtitle data to ensure that the appropriate subtitles are superimposed with the correct video picture. In encoding, subtitles are generated in correspondence to a video picture. The subtitles are separately encoded and multiplexed with the video picture for transmission. Upon decoding, the subtitles are selected at a time which corresponds to the display of the corresponding video picture. Since the subtitles are processed separately from the video data, the subtitles may be manipulated with great control; thus providing more flexibility in encoding and decoding.

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33. A subtitle processor for processing subtitle data comprising:

Element

Basis / Comment

(a) bit stream select means for selecting a respective bit stream of the subtitle data from among a plurality of supplied subtitle data bit streams;

Closed caption decoding functionality compliant to CEA-708-C is a mandatory requirement for DTV receivers. In response to user command, digital TV receiver chooses one caption service when a plurality of caption services are available for a TV show. See section 3 of CEA-708-C standard.

(b) time display stamp means for indicating a time when said selected bit stream is to be decoded;

Delay command has a time-out period specified as its parameter. This period is specified in tenths of seconds. See section 8.9.1 and 8.10.5.11 of CEA-708-C standard.

(c) decode start means for initiating decoding of said selected bit stream at said time indicated by said time display stamp means; and

When the delay interval expires, decoding of closed captioning data is resumed. See section 9.2 of CEA-708-C standard.

(d) mixing means for mixing said selected bit stream decoded by said decode start means with video picture data.

Decoded caption signal is superimposed on video image.

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3 Caption Channel Layered Protocol

A formal data communications channel protocol has been established for the DTVCC caption data channel. This formalization provides a framework for describing the caption communications hierarchy. Grouping the structures, concepts, and features of this environment into the following hierarchical layers aids in the understanding of the organizational aspects of the DTVCC system.

There are 5 layers in the DTVCC data framework: DTVCC Transport Layer, DTVCC Packet Layer, DTVCC Service Layer, DTVCC Coding Layer, and DTVCC Interpretation Layer (see Figure 1). Similar to the OSI Reference Model, each of these layers provides particular services in the receiver, as shown in Table 1.

Processing of the Caption Channel packet data begins in the DTVCC Service Layer. Caption Channel packets are broken up into the encapsulated sub-blocks of data to be routed to one or more separate caption service processing routines within the decoder.

Using information in the DTVCC service directory, such as that sent in the Event Information Table (EIT) or Program Map Table (PMT) (see ATSC A/53E and ATSC A/65C), TV viewers may choose to view the processed data for one or more DTVCC services at a time. For example, a caption channel may contain an English language service and a Spanish language service.

The DTVCC Coding Layer breaks out the individual caption commands and caption text sequences from the service data blocks.

The DTVCC Interpretation Layer processes the caption elements presented by the DTVCC Coding Layer.

The DTVCC Interpretation Layer also provides for delaying the interpretation of the command stream and reset of a specific Caption Service.

Page 5-7 of CEA-708-C DTVCC standard

8.9.1 Delay Command

Decoders shall maintain a Service Input Buffer for each of the services which can be processed simultaneously. This input buffer has a minimum size of 128 bytes. All DTVCC data for a service pass through the Service Input Buffer. Most of the time, the data falls through the buffer instantaneously, and the data are processed by the DTVCC decoder as they are received.

The Delay command is used to instruct the decoder to suspend processing of the Service Input Buffer data for a specified time period. This command has a time-out period specified as its parameter. This period is specified in tenths of seconds.

When a Delay command is encountered, the decoder waits for the specified delay time to expire before processing any other service data. During the delay interval, incoming data for the active service is buffered in the Service Input Buffer. When the delay interval expires, interpretation of the incoming data is resumed.

Page 57 of CEA-708-C DTVCC standard

9.22 DTVCC Section 8.9 - Service Synchronization

Service Input Buffers shall be at least 128 bytes in size. When a Delay command is encountered, the decoder should wait for the specified delay time to expire before processing any other service data. During the delay interval, incoming data for the active service should be buffered in the Service Input Buffer. When the delay interval expires, interpretation of the incoming data should be resumed.

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8.10.5.11 DELAY - (DLY)

Name: Delay - Delays service data interpretation

Command Type: Synchronization

Format: Delay (tenths of seconds)

Parameters: \bullet tenths of seconds (t) is the number of tenths of seconds to delay before recommencing service data interpretation.

Command Coding: DLY = 8Dh (10001101b)

b ₇	b ₆	b ₅	b ₄	b ₃	b ₂	b ₁	b ₀	
1	0	0	0	1	1	0	1	command
t ₇	t ₆	t ₅	t ₄	t ₃	t ₂	t ₁	t ₀	param1

Description: Delay instructs receivers to suspend interpretation of the current service's command input buffer. The delay is specified in tenths of seconds. Once the delay time expires, interpretation of caption commands recommences.

The delay value may range from 1 to 255 – which specifies an effective delay time from 1/10 to 25.5 (255/10) seconds.

A delay for a service remains in effect until one of the following occurs:

- the specified delay time expires
- a DelayCancel command is received
- the service's input buffer becomes full
- a service Reset command is received

Delay Example

The two byte command "0x8D, 0x0B" suspends interpretation of the current service's command buffer for 1.1 seconds. Other caption services, and CEA-608-C caption services are not affected.

a) tenths of seconds = 0x0B = 11

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